ORIENTAL AND PACIFIC THRIPIDAE (THYSANOPTERA) NEW TO AUSTRALIA, WITH A NEW SPECIES OF *PSEUDODENDROTHRIPS* SCHMUTZ

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Abstract

Nine species of Thripidae not yet, or only recently, listed from Australia are recorded from Queensland, with *Pseudodendrothrips alexei* described as new. Seven of these species are known from tropical areas to the north of Australia [*Anaphothrips swezeyi* Moulton; *Bathrips melanicornis* (Shumsher); *Caprithrips orientalis* Bhatti; *Craspedothrips minor* (Bagnall); *Danothrips trifasciatus* Sakimura; *Mycterothrips nilgiriensis* (Ananthakrishnan); *Scolothrips asura* Ramakrishna & Margabandhu]. The other two have been collected on plant species also found in Asia [*Mycterothrips desleyae* Masumoto & Okajima; *Pseudodendrothrips alexei* sp. n.]. These records further emphasise the difficulties of distinguishing between native and invasive thrips species in the norther Australian fauna.

Introduction

The number of Thysanoptera species recognised in Australia has increased considerably in recent years. Prior to 1915 fewer than 20 Australian species had been described (Mound 1996), but the number had increased to 287 by 1970 (CSIRO 1970), to 400 by 1974 (CSIRO 1974), and to 445 by 1996 (Mound 1996). In 2006 the total number of species listed on the Australian Biological Resources Study (2006) web site was 700. Most are Australian endemics, although about 10% of them are introduced from other countries. In this paper our objectives are to record from Australia six further Thripidae that either have been imported inadvertently on living plants or are natural immigrants into northern Australia. In addition, two endemic species are discussed that we have collected recently near Brisbane. Both are from plant species that have distributions into Asia. One, Pseudodendrothrips alexei sp. n., is described here; the second, Mycterothrips deslevae, was described by Masumoto and Okajima (2006), together with the first Australian record of the congeneric M. nilgiriensis (Ananthakrishnan). The presence of these nine species further emphasises the difficulties of distinguishing between invasive and native thrips species in northern Australia.

In southern Australia, introduced species are usually readily distinguished from the native fauna, particularly because of their association with nonnative plants, but in the northern tropical zone this distinction is less easy. Not only are many plant species in northern Australia shared with Asia, but many thrips species are potentially wind-dispersed immigrants from Indonesia (Mound 2004). For all nine species discussed here bibliographic and synonymic details are available in the Checklist of World Thysanoptera (Mound 2005). Voucher specimens are in the Australian National Insect Collection [ANIC], Canberra, and Queensland Department of Primary Industries Collection [QDPI], Indooroopilly, except where indicated.

Anaphothrips swezeyi Moulton

Described from Hawaii on sugar cane (Moulton 1928), this species is otherwise recorded only from New Caledonia, where it was collected on roadside grasses (Bournier and Mound 2000). Recently, both sexes have been collected in eastern Queensland, on grasses at several sites: Cape Tribulation (vii.1995), Sherwood, Brisbane (iii.2002), Port Douglas (viii.2004). It is a typical member of the genus with no long setae on the pronotum, and can be recognised by the following characteristics: body clear yellow; antennae 8-segmented with segments I-II yellow, III-IV light brown and V-VIII brown; ocellar setae III arising outside the ocellar triangle; metanotum with transverse reticulation, campaniform sensilla absent; abdominal tergite VIII with a posteromarginal comb of long uniform microtrichia.

Bathrips melanicornis (Shumsher)

Described from India (Shumsher 1946), this species is also recorded from Myanmar, Java, Malaya and Taiwan (Bhatti 1990). Moreover, specimens are available [in ANIC] from Bali, Thailand and East Timor. Collections from Thailand suggest that this thrips is associated with the leaves of vegetable crops, including potatoes. In Australia, a few females have been collected at several sites in eastern Queensland and northern New South Wales: Cape Tribulation (vii.1995), Mareeba (i.1998), Mt Glorious, Brisbane (iii.2002), south of Lamington N.P. (vii.2002). The body colour is distinctive: abdomen yellow but each tergite with a large dark mark medially; forewings and all antennal segments dark; head with a pair of long setae between the posterior ocelli, but without a pair of setae in front of the first ocellus; pronotum with two pairs of long posteroangular setae; metanotum with no sculpture medially, median setae arise behind anterior margin and campaniform sensilla absent; tergite VIII with no posteromarginal comb.

Caprithrips orientalis Bhatti

Described from central India (Bhatti 1973), this minute apterous grass-living species has been recorded subsequently from Fiji (Mound and Walker 1987) and New Caledonia (Bournier and Mound 2000). Two females were collected on grasses at two separate sites in eastern Queensland during July, 1995: 15 km south of Charters Towers and just south of Townsville. This is the third member of this genus recorded from Australia; *C. moundi* Bhatti is common in the tussocks of native *Poa* species in southern Australia, whereas *C. insularis* Beshear from Trinidad and Surinam was recorded in Australia from one female collected just south of Brisbane. In publishing this record, Bhatti (1980a) provided an identification key to these species.

Craspedothrips minor (Bagnall)

Described from southern India (Bagnall 1921), this species has also been described, under other names, from Indonesia and Taiwan (Bhatti 1990). Little information is available on its biology, although specimens have been

studied from *Cassia* taken at New Delhi. From Australia the following specimens have been studied: Western Australia, Broome, two females from *Solanum melongena* (iv.1999); New South Wales, 30 km west of Nelligen, one female from *Lomandra longifolia* flowers (x.2000); Queensland, Rockhampton, eight females from *Plumbago zeylonica* flowers (xi.2005). Members of this genus of Thripidae are distinguished by the presence of two exceptionally stout sensoria on the inner and outer margins of antennal segment V, plus one similar one on the external margin of segment VI. The body of *C. minor* is brown, with brown forewings and antennae, and the species has the following character states: head with a pair of small setae in front of first ocellus, ocellar setae III long and arising within ocellar triangle; antennal segment IV with slender neck-like apex; metanotum with weak sculpture medially, median setae almost at anterior margin, campaniform sensilla present; sternites and tergites (including VIII) with narrow marginal craspedum.

Danothrips trifasciatus Sakimura

Described from Hawaii (Sakimura 1975) as causing damage to Anthurium plants, this species is recorded as producing spots on the skin of red grapefruit (*Citrus*) in Florida (Childers 1997). Moreover, Bhatti (1980b) recorded it as damaging banana fruit in the Caribbean, and also recorded it from Sumatra. In Australia the species is known from a single female, taken from a succulent plant in a suburban garden at Sherwood, Brisbane (xii.2002). This is a yellow species with slender forewings that bear three shaded cross-bands, at base, middle and near apex. The structural features are: head and pronotum with almost no sculpture, no setae in front of first occllus; metanotal median setae far from anterior margin; median tergites with transverse sculpture lines medially; tergite VIII with no posteromarginal comb of microtrichia.

Mycterothrips desleyae Masumoto & Okajima

The genus *Mycterothrips* Trybom was recorded recently from Australia during a revision of the world species (Masumoto and Okajima 2006). The two species found in Australia share the following characters: head with pair of setae in front of first ocellus, ocellar setae III long and arising within ocellar triangle; antennae 8-segmented, segment I with a pair of dorso-apical setae; setal row on forewing first vein with long interval then 2 setae near wing apex; tergite VIII with conspicuous posteromarginal comb of long slender microtrichia. Moreover, the males of the two Australian species have remarkable antennae in which the sixth segment is greatly enlarged and bears numerous setae like a bottle brush. The second instar larvae are distinctive, with the major setae long but broadly capitate with coarsely fringed apices. *M. desleyae* was collected in substantial numbers, between October 2005 and January 2006, breeding on the leaves of several trees of *Clerodendrum floribundum* in Brisbane Forest Park. A few specimens were also taken from

the flowers and branches of these trees, and several specimens were collected from the same plant species at Cooloola National Park, north of Brisbane. The males of *M. desleyae* have antennal segment VI between 0.5 and 0.6 times as long as the combined lengths of segments I–V.

Mycterothrips nilgiriensis (Ananthakrishnan)

Described from southern India (Ananthakrishnan 1960), this species has been recorded widely across India (Bhatti 1990) and from Nepal and Taiwan (Masumoto and Okajima 2006). The latter authors also identified two specimens from the ANIC as this species: Queensland, Mt. Glorious, one female, January 1988; and New South Wales, Wisemans Ferry, one female, April 1968. Subsequently, in October 2006, a long series of males, with two females and one second instar larva, were collected from the leaves of *Ficus coronata*, 15 km west of Mt Glorious, and a few males were also taken from the leaves of *Ricinus communis* at the same locality. The males have antennal segment VI more than 1.0 times as long as the combined lengths of segments I–V.

Scolothrips asura Ramakrishna & Margabandhu

Described from India (Ramakrishna and Margabandhu 1931), and also known from Bangladesh and southern China (Bhatti 1960) as well as Taiwan (LAM collection), a single female of this distinctive species is preserved in the University of California Riverside Collection, collected at Gordonvale, northern Queensland, in January 1966. As in other species of the genus, all of which are predators on leaf-feeding mites, the forewings are transversely banded and the pronotum bears six pairs of exceptionally long setae. However, the body of *S. asura* is brightly coloured, with the legs, pronotum and abdominal segments IV–V white, the head, pterothorax and abdominal segments VI–VIII brown and with bright red internal pigment.

Pseudodendrothrips alexei sp. n.

(Figs 1-4)

Types. Holotype 9, QUEENSLAND: Brisbane Forest Park, from leaves of *Maclura cochinchinensis* (Moraceae), 16.i.2006 (LAM 4815) (in ANIC, Canberra). *Paratypes*: 9 99 collected with holotype (in ANIC, Canberra, and QDPI, Indooroopilly).

Description. Female macropterous, body light brown to brown with extensive red internal pigment (in life appearing almost black); antennae light brown, segments IV–VI yellow in basal half; all tibiae yellow at base and apex; forewings uniformly shaded; compound eyes with 5 weakly pigmented facets. Head broader than long (Fig. 1), ocellar triangle finely sculptured, also area in front of ocelli; 3 pairs of ocellar setae present, pair I lateral to anterior margin of fore ocellus, pair III slightly fluted and arising between anterior margins of hind ocelli; maxillary palps 2-segmented. Antennae 8-segmented (Fig. 2); segment VI with major sensorium arising at a point about 25% of the segment length from the base. Pronotum transversely reticulate with

markings inside each reticle (Fig. 1); one pair of prominent posteroangular setae, 2 pairs of posteromarginals; all setae slightly fluted. Forewing first vein with 3 setae near base and 2 setae distally, ventrally with row of corpusculae (see Bhatti 1997); anteromarginal cilia arising slightly sub-marginally; clavus with apex rectangular bearing 2 veinal and 1 discal setae. Sculpture of mesonotum and metanotum (Fig. 3), also abdominal tergites (Fig. 4), typical of genus.



Figs 1-4. *Pseudodendrothrips alexei* sp. n.: (1) head and pronotum; (2) antenna; (3) mesonotum and metanotum; (4) abdominal tergites IV–VI.

Second instar larva white with three pairs of dark spots on pronotum, two pairs each on meso and metanotum, and two pairs in a transverse row on tergites II - VIII; spiracles on tergites II and VIII small, dorsal, surrounded by dark area; major setae minute with blunt apices.

Measurements. Holotype female in microns. Body length 750. Head, length 50; width across eyes 150; ocellar setae III length 20. Pronotum, length 65; width 150; posteroangular setae 35. Forewing length 530. Hind tibia length 85; hind tarsus length 50. Antennal segments III–VIII length 28, 25, 25, 25, 10, 35.

Comments. Members of the genus *Pseudodendrothrips* Schmutz can be recognised by the enlarged (lyre-shaped) metathoracic endofurca, the elongate hind tarsi that are more than half the length of the hind tibiae and the distinctive sculpture of the mesonotum and metanotum (Fig. 3). *P. alexei* sp. n. differs from all 16 previously known species in the long and slightly fluted interocellar setae. The forewings are uniformly light brown, a character state shared with one species from northern India, but the sensorium on the sixth antennal segment does not arise as close to the base as in the other members of this genus. The antennae are 8-segmented, but the suture between antennal segments VI and VII is oblique and variable amongst the available specimens, and is not present dorsally in the right antenna of the holotype. Because of this, when more extensive samples are examined individuals can be expected to occur in which the suture is not developed at all, and the antennae would thus have only seven visible segments.

Two South American species described in this genus (Hood 1952) are more properly placed in the related Neotropical genus *Halmathrips* Hood, as indicated by Mound and Marullo (1996). The remaining species are all from the Old World tropics and sub-tropics (Table 1), but no comprehensive account of these has been published. The sculpture of the metanotum and the abdominal tergites (Figs 3, 4) is remarkably constant among all of the known species, and these have been distinguished generally on slight colour differences and the number of antennal segments. The body colour of 13 species is described as various shades of white to yellow, sometimes with the head slightly darker around the bases of the antennae, and the forewings pale to slightly shaded. However, the identity of some of these pale species is uncertain (Mound 1999) and requires confirmation through a study of more extensive series to investigate variation within and between populations. Two described species are distinctive in having banded forewings, and one other species has the body and wings uniformly brown (Table 1).

The number of antennal segments, whether eight or nine, is used commonly to distinguish species in this genus, although subdivision of the terminal antennal segments is known to be variable in related species. The sixth antennal segment is sometimes subdivided producing an apparent 9segmented antenna, alternatively this segment is not only undivided but is fused to the seventh segment, thus producing a 7-segmented antenna. Within this genus, when a species is known from a good series of specimens it is not unusual to find that the number of antennal segments is unstable.

Species	Antennal segments	Localities
(i) Body white to yellow, head sometimes darker		
aegyptiacus Priesner, 1965.	8	Egypt; Canary Is.
albana Bhatti, 1997	9	India
bhattii Kudo, 1984	8/9	Japan; Australia
candidus zur Strassen, 1993	9	Cape Verde Is.
ficus Hartwig, 1948	9	South Africa
darci Girault, 1930	8/9	Australia
mori Niwa, 1908	8/9	Widespread
(ii) Body yellow, head brown		
fumosus Chen, 1980	9	Taiwan
lateralis Wang, 1993	9	Taiwan
ornatissimus Schmutz, 1913	9	Sri Lanka; India
puerariae Zhang & Tong, 1990	9	China
suvarna Bhatti, 1997	8/9	India
ulmi Zhang & Tong, 1980	9	China
(iii) Forewings with dark and light bands		
gillespiei Mound, 1999	9	Australia
maculosus Reyes, 1994	8	Philippines
(iv) Body and wings uniformly brown		
kulshresthai Chaunan & Vijay Veer, 1992	8	India
alexei sp. n.	8	Australia

Table 1. World species of *Pseudodendrothrips* Schmutz. For synonymies and publication details see Mound (2005).

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